

Exhibit A

1. A method to identify agents that bind to a BT-toxin receptor, said method comprising the steps of:

(i) contacting an agent with a BT-toxin binding receptor selected from the group consisting of

(a) a cell that has been altered to contain a nucleic acid molecule that encodes a BT-toxin receptor having the amino acid sequence of SEQ ID NO:2 and expresses said receptor;

(b) a cell that has been altered to contain a nucleic acid molecule encoding a BT-toxin receptor, wherein said nucleic acid molecule hybridizes to the polynucleotide sequence of SEQ ID NO:1 under stringent conditions, wherein said cell expresses said receptor and wherein said receptor is obtainable from an insect;

(c) a cell that has been altered to contain a nucleic acid molecule that encodes a BT-toxin receptor, wherein said nucleic acid molecule hybridizes to the polynucleotide sequence of SEQ ID NO:1 under stringent conditions, wherein said cell expresses the receptor and the receptor encoded by the nucleic acid binds to the CryIA(b) toxin;

[(d) a cell that has been altered to contain a fragment of the nucleic acid of (a), (b), or (c), wherein the cell expresses the polypeptide encoded by said fragment and wherein the encoded polypeptide binds to the CryIA(b) toxin and wherein the fragment is about the same length as the protein fragment encoded by a Bam-Sac nucleic acid fragment of SEQ ID NO:1;]

[(e)] an isolated BT-toxin receptor having an amino acid sequence of SEQ ID NO:2;

[(f)] an isolated BT-toxin receptor that is encoded by a nucleic acid molecule that hybridizes to the polynucleotide sequence of SEQ ID NO:1 under stringent conditions, wherein said receptor is obtainable from an insect; and

[(g)] an isolated BT-toxin receptor encoded by a nucleic acid molecule that hybridizes to the polynucleotide sequence of SEQ ID NO:1 under stringent conditions, wherein the receptor encoded by the nucleic acid binds to the CryIA(b) toxin;[and]

[(h) an isolated fragment of the BT-toxin receptor of (e), (f), or (g), wherein said fragment binds to the CryIA(b) toxin and wherein the fragment is about the same length as the protein fragment encoded by a Bam-Sac nucleic acid fragment of SEQ ID NO:1;]

(ii) determining whether said agent binds to said BT-toxin receptor; wherein the stringent conditions comprise:

50% formamide, 0.1% bovine serum albumin, 0.1% Ficoll, 0.1% polyvinylpyrrolidone, 50 mM sodium phosphate (pH 6.5), 750 mM NaCl, and 75 mM sodium citrate at 42°C, with washes at 42°C in 0.2x SSC and 0.1% SDS;

or

50% formamide, 5x SSC, 50 mM sodium phosphate (pH 6.8), 0.1% sodium pyrophosphate, 5x Denhardt's solution, sonicated salmon sperm DNA (50 µg/ml), 0.1% SDS, and 10% dextran sulfate at 42°C, with washes at 42°C in 0.2x SSC and 0.1% SDS;

or

0.015M NaCl, 0.0015M sodium citrate, and 0.1% SDS at 50°C.

S. A method to identify agents that block the binding of a BT-toxin to a BT-toxin receptor, said method comprising the steps of:

(i) contacting an agent, in the presence and absence of a BT-toxin, to a BT-toxin binding receptor or cell expressing said receptor selected from the group consisting of:

(a) a cell that has been altered to contain a nucleic acid molecule that encodes a BT-toxin receptor having the amino acid sequence of SEQ ID NO:2 and expresses said receptor;

(b) a cell that has been altered to contain a nucleic acid molecule that encodes a BT-toxin receptor, wherein said nucleic acid molecule hybridizes to the polynucleotide sequence of SEQ ID NO:1 under stringent conditions, wherein said cell expresses said receptor and wherein said receptor is obtainable from an insect;

(c) a cell that has been altered to contain a nucleic acid molecule encoding a BT-toxin receptor, wherein said nucleic acid molecule hybridizes to the polynucleotide sequence of SEQ ID NO:1 under stringent conditions, wherein said cell expresses the receptor and the receptor encoded by the nucleic acid binds to the CryIA(b) toxin;

[(d) a cell that has been altered to contain a fragment of the nucleic acid of (a), (b), or (c), wherein the cell expresses the polypeptide encoded by said fragment and wherein the encoded polypeptide binds to the CryIA(b) toxin and wherein the fragment is about the same length as the protein fragment encoded by a Bam-Sac nucleic acid fragment of SEQ ID NO:1;]

([e]l[d]) an isolated BT-toxin receptor having an amino acid sequence of SEQ ID NO:2;

([f]e) an isolated BT-toxin receptor that is encoded by a nucleic acid molecule that hybridizes to the polynucleotide sequence of SEQ ID NO:1 under stringent conditions, wherein said receptor is obtainable from an insect; and

([g]f) an isolated BT-toxin receptor encoded by a nucleic acid molecule that hybridizes to the polynucleotide sequence of SEQ ID NO:1 under stringent conditions, wherein said receptor encoded by the nucleic acid binds to the CryIA(b) toxin; [and]

[(h) an isolated fragment of the BT-toxin receptor of (e), (f), or (g), wherein said fragment binds to the CryIA(b) toxin and wherein the fragment is about the same length as a protein fragment encoded by a Bam-Sac nucleic acid fragment of SEQ ID NO:1;]

(ii) determining whether said agent blocks the binding of said BT-toxin to said BT-toxin receptor,

wherein the stringent conditions comprise:

50% formamide, 0.1% bovine serum albumin, 0.1% Ficoll, 0.1% polyvinylpyrrolidone, 50 mM sodium phosphate (pH 6.5), 750 mM NaCl, and 75 mM sodium citrate at 42°C, with washes at 42°C in 0.2x SSC and 0.1% SDS;

or

50% formamide, 5x SSC, 50 mM sodium phosphate (pH 6.8), 0.1% sodium pyrophosphate, 5x Denhardt's solution, sonicated salmon sperm DNA (50 µg/ml), 0.1% SDS, and 10% dextran sulfate at 42°C, with washes at 42°C in 0.2x SSC and 0.1% SDS;

or

0.015M NaCl, 0.0015M sodium citrate, and 0.1% SDS at 50°C.

13. A method to produce a BT-toxin receptor protein, or a fragment thereof, said method comprising the steps of:

(i) culturing a cell that has been altered to contain a nucleic acid molecule that encodes a BT-toxin receptor protein, or BT-toxin binding fragment thereof, under conditions suitable for expression of said receptor protein or fragment thereof, wherein said cell has been altered to contain a nucleic acid molecule selected from the group consisting of:

(a) a nucleic acid molecule that encodes the amino acid sequence of SEQ ID NO:2;

(b) a nucleic acid molecule encoding a BT-toxin receptor, wherein said nucleic acid molecule hybridizes to the polynucleotide sequence of SEQ ID NO:1 under stringent conditions, and wherein said receptor is obtainable from an insect; and

(c) a nucleic acid molecule encoding a BT-toxin receptor, wherein said nucleic acid molecule hybridizes to the polynucleotide sequence of SEQ ID NO:1 under stringent conditions, wherein the receptor encoded by the nucleic acid binds to the CryIA(b) toxin; [and]

[(d) a fragment of the nucleic acid of (a), (b) or (c), wherein said fragment encodes a polypeptide that binds to the CryIA(b) toxin and wherein the fragment is about the same length as the protein fragment encoded by a Bam-Sac nucleic acid fragment of SEQ ID NO:1; and]

(ii) isolating said BT-toxin receptor protein or fragment;
wherein the stringent conditions comprise:

50% formamide, 0.1% bovine serum albumin, 0.1% Ficoll, 0.1% polyvinylpyrrolidone, 50 mM sodium phosphate (pH 6.5), 750 mM NaCl, and 75 mM sodium citrate at 42°C, with washes at 42°C in 0.2x SSC and 0.1% SDS;

or

50% formamide, 5x SSC, 50 mM sodium phosphate (pH 6.8), 0.1% sodium pyrophosphate, 5x Denhardt's solution, sonicated salmon sperm DNA (50 µg/ml), 0.1% SDS, and 10% dextran sulfate at 42°C, with washes at 42°C in 0.2x SSC and 0.1% SDS,

or

0.015M NaCl, 0.0015M sodium citrate, and 0.1% SDS at 50°C.